

REMARKS

Claims 1, 3-8 and 10-17 are currently pending. Claims 14, 16 and 17 have been allowed. Applicants thank the Examiner for the allowance of claims 14, 16 and 17. Claim 15 is amended herein. Applicants respectfully request reconsideration of the above-identified application in light of the above amendments and the following remarks.

Claim 15 has been amended to recite “[t]he apparatus according to claim 14, further comprising a vibration device, which includes the vibrator, the first transducer, and the second transducer all joined as a unit,” in order to better define Applicants’ invention. Support for this amendment is found throughout the Specification and Drawings, as filed, for example at page 6, line 27- page 7, line 23 and in Figures 1, 2, 7 and 8.

Claim 15 has been further amended to recite, “wherein the external impedance element is one of a plurality of external impedance elements, a second external impedance element being located in the second transducer for adjusting the impedance of the vibration device,” to better define Applicants’ invention. Support for this amendment is found throughout the Specification and Drawings, as filed, for example at page 8, lines 1-16 and in Figures 1, 2, 7 and 8.

Claim Rejections under 35 U.S.C. §112

1. Claim 15 has been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Applicants respectfully traverse this rejection.

Claim 15 has been amended as described above. As amended, claim 15 recites “a plurality of external impedance elements, a second external impedance element ... located in the second transducer,” which further defines over independent claim 14. Claim 15, as amended,

also recites that “a vibration device, which includes the vibrator, the first transducer, and the second transducer [are] all joined as a unit,” defining additional subject matter over independent claim 14. As amended, claim 15 is believed to satisfy the requirements of 35 U.S.C §112, second paragraph.

Accordingly, withdrawal of the rejection applied to claim 15 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite, is respectfully requested.

Claim Rejections under 35 U.S.C. §103

2. Claims 8 and 11-13 have been rejected under 35 U.S.C. as being unpatentable over JP 09-202425 in view of U.S. Patent No. 5,810,155 to Hashimoto (“Hashimoto”). Applicants respectfully traverse this rejection.

JP 09-202425 and Hashimoto cannot render obvious the subject matter of claims 8 and 11-13 because they, neither alone or in combination teach or suggest each and every feature of these claims. MPEP states, “To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.” (MPEP § 2143.03 (citing In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))).

JP 09-202425 describes an object carrier having, *inter alia*, first and second transducers, the second transducer changing mechanical energy into electrical energy. This electrical energy is passed through a RL circuit whose sole purpose and function is to convert the electrical energy to heat energy to be dissipated. This dissipation of the mechanical energy allows formation of “traveling waves” (paragraph 0053, lines 10-11). No other purpose or function of the RL circuit of JP 09-202425 is taught or suggested. See JP 09-202425, partial

English translation (filed in an IDS by Applicants on October 25, 2001) at paragraph 0053, last line - paragraph 0055; paragraph 0057; Figures 1, 3 and 7.

Hashimoto describes an object levitating apparatus having, *inter alia*, a vibrator (11), generator (15), oscillator (14) and horn (12). In one embodiment (Figure 11) the apparatus of Hashimoto includes an “energy conversion device” (41), consisting of a RL circuit. Similarly to JP 09-202425, the energy of ultrasonic waves coming from a first transducer/ vibrator (11) are converted to electrical energy by the energy conversion device (41), and dissipated as heat. See Hashimoto, column 10, lines 12-34 and Figure 11. As with JP 09-202425, this is the sole purpose and function of the RL circuit. No other purpose or function of the RL circuit of Hashimoto is taught or suggested.

Neither JP 09-202425 nor Hashimoto teaches or suggests an apparatus for levitating and transporting an object “wherein each vibration device includes an adjuster for adjusting the impedance of the vibration device,” as recited in independent claims 1 and 8, much less do they teach or suggest that “the adjuster includes a piezoelectric element, which converts mechanical energy into electrical energy; and an external impedance element, the impedance of which is variable,” as recited in independent claim 8. Since no other purpose or function of the RL circuits of JP 09-202425 and Hashimoto is taught or suggested, as described above, these RL circuits do not, and cannot, function as the claimed “adjustors.” As energy conversion and dissipation devices, they also do not teach or suggest such a feature.

The adjustability of the vibration device, as claimed in independent claims 1 and 8 is provided so that objects can be stably levitated by the claimed plurality of vibration devices. Due to errors that can arise in fabrication of the components of the claimed apparatus, it is beneficial to be able to match resonant frequencies of the vibration devices. Neither JP 09-

202425 nor Hashimoto provides a method or apparatus for doing so, much less an apparatus as claimed in independent claims 1 and 8.

For at least the above reasons, independent claim 8 and claims 11-13, which depend from claim 8, define patentable subject matter over JP 09-202425 and Hashimoto, alone or in combination. Withdrawal of the rejection applied to claims 8 and 11-13 under 35 U.S.C. as being unpatentable over JP 09-202425 in view of Hashimoto is respectfully requested.

3. Claims 1, 3 and 5-7 have been rejected under 35 U.S.C. §103(a) as being unpatentable JP 09-202425 in view of Hashimoto, further in view of U.S. Patent No. 4,284,403 to Rey (“Rey”). Applicants respectfully traverse this rejection.

The deficiencies of JP 09-202425 and Hashimoto in teaching or suggesting the subject matter of independent claims 1 and 8 have been set forth above. Rey does not remedy these deficiencies.

Rey describes an acoustic levitation device and method. Rey’s device and method focus on the use of a reflector (16) located above a sound device (10). This arrangement creates a three-dimensional energy well (26), in which an object (20) may be held. As with JP 09-202425 and Hashimoto, Rey does not teach or suggest an apparatus for levitating and transporting an object “wherein each vibration device includes an adjuster for adjusting the impedance of the vibration device,” as recited in independent claims 1 and 8, much less does Rey teach or suggest that “the adjuster includes a piezoelectric element, which converts mechanical energy into electrical energy; and an external impedance element, the impedance of which is variable,” as recited in independent claim 8.

For at least the above reasons, independent claim 1 and claims 3 and 5-7, which depend from claim 8, define patentable subject matter over JP 09-202425 and Hashimoto, alone or in combination. Withdrawal of the rejection applied to claims 1 and claims 3 and 5-7 under 35 U.S.C. as being unpatentable over JP 09-202425 in view of Hashimoto, further in view of Rey, is respectfully requested.

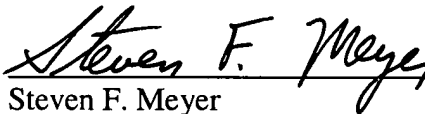
CONCLUSION

For the foregoing reasons, Applicants believe that all claims, as currently presented are patentable, and that this application is in condition for allowance.

Respectfully submitted,
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